

THE REMEDIATOR

Environmental Remediation at the Savannah River Site

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Construction activities at the Dynamic Underground Stripping project continue on schedule. Steam will be injected into the subsurface to remove solvent contamination. (Cover photo by Roland Collins)

Safety Works

Safe workplace depends on values

By LISA SAVAGE-LEONARD

There is no simple equation or process that can ensure a safe workplace. For safety programs like that of Soil and Groundwater Closure Projects (SGCP), safety is ensured by collective elements that depend highly on the involvement of all employees and management. The support of each of these elements has affected SGCP's safety performance immensely, resulting in an upward trend of performance ratings from 1999 to the present.

SGCP's safety program is now rated 96 out of 100 and by the end of September, SGCP reached a milestone

of six million safe hours (approximately five years without a lost-time injury).

SGCP's success in safety is due to the values and beliefs of the workforce and the organization's culture," said SGCP's Safety Manager, Larry Thebo. Management provides the leadership to shape the culture by defining objectives and desired behaviors. Also, individuals that value their own safety and the safety of others tend to make safe choices.

Based on SGCP's value of workplace safety, several elements were developed that make up SGCP's safety program and are ultimately responsible for the program's overall success. Behavior Based Safety (BBS), the Integrated Safety Management System (ISMS), Safety Works, and Stop-Think-Act-Review (STAR) are key players in SGCP's safety program.

BBS is an observation/dialogue-based safety process designed to recognize both safe work practices and identify potential unsafe behaviors that may lead to workplace injuries. Personnel participate in BBS by volunteering as BBS Observers or by serving on Local Safety Improvement Teams. BBS points out how common sense safety precautions can easily be overlooked.

ISMS provides a safe practices cycle in which all work is managed and performed in accordance with the core functions represented by the cycle. This includes work ranging from site level activities such as designing facilities or processes to individual tasks such as driving an automobile.

Any safety program would be lost without a group of select personnel whose objective is to analyze and improve existing safety conditions. The Safety Works group is responsible for communicating safety initiatives for many areas including chemical management, emergency preparedness, reportable occurrence notifications and BBS.

Lastly, STAR is an easy to remember, self-checking concept which invokes one to focus on their present activity. This sensible process is definitely a major contributor to individual safety.

Currently, SGCP is enjoying an excellent safety record, and every employee is encouraged to get involved with all elements of the safety program. SGCP has demonstrated that a team-oriented approach to safety can be a successful method of maintaining a safe workplace.



Personal protective equipment is standard on-the-job safety gear.

DOE manager shares her vision of accelerated cleanup at SRS

By LETICIOUS B. WELCHER

On June 19, 2003 the Savannah River Site signed a Memorandum of Agreement (MOA) with the U.S. Environmental Protection Agency Region IV and the South Carolina Department of Health and Environmental Control which sets forth principles for accelerating the site's cleanup, beyond the objectives of the SRS Environmental Management Program Performance Management Plan.



Alice Doswell

This MOA will enable SRS to reduce its operations footprint and establish a larger buffer zone at the perimeter of the site. The central area of the site will then be reserved for continuing or future long-term operations. The parties agree that establishing this buffer zone and appropriately sequencing environmental restoration and decommissioning activities can lead to early closure of whole areas.

Alice Doswell, Acting Assistant Manager for Closure Projects at the Department of Energy-Savannah River, believes that the MOA serves as the framework for accelerated cleanup. "It defines a common set of principles and concepts for the three parties involved."

The MOA also calls for a Comprehensive Cleanup Plan

(CCP) which will define end states and achieve earlier completion for the environmental restoration and facility decommissioning programs at SRS and become the basis of the Federal Facility Agreement Appendices D and E. "I expect that the CCP will serve as an integrated road map to EM closure in 2025," stated Doswell.

Consistent with its recently revised contract with DOE, Westinghouse Savannah River Company (WSRC) now plans to accelerate cleanup by remediating additional waste sites and decommissioning additional buildings beyond those originally planned from 2003-2006.

To achieve this vision, WSRC will implement a variety of key initiatives, one of which is to put into operation an area by area remediation strategy as a means of bringing closure to waste sites located near currently active facilities as well as complete work in sequence with deactivation and decommissioning activities.

Doswell's vision is a simple one.

"My vision is to accelerate area closure and finish cleanup activities in these areas so they can be deleted from the National Priorities List."

Accelerating the remediation plan not only translates into \$450 million of savings, but also into complete environmental restoration in whole areas of the site and turn over of areas for Long Term Stewardship scope in a much shorter time frame than is reflected in the current baseline.

Regulatory Communications

Core team approach produces cleanup consensus, improved focus

By LETICIOUS B. WELCHER

The environmental restoration program at the Savannah River Site is known for its strong working relationship with the U.S. Department of Energy, the U.S. Environmental Protection Agency and the South Carolina Department of Health and Environmental Control. This sound relationship is due in part to the creation of a Core Team that is comprised of the three parties and contractor personnel.

The Core Team approach is a formalized, consensus-based process in which those individuals with decision-making authority, including DOE, EPA and State remedial project managers, work together to reach agreement on key remediation decisions.

Equally important, the Core Team works to ensure that all technical support staff and stakeholders are involved and communicating effectively throughout the decision-making process.

Working together as a team does not change the role or

responsibilities of the agency representatives. For example, participation of regulatory agency personnel on the Core Team in no way limits their discretion to use whatever enforcement authorities they may deem appropriate over the course of a project. Similarly, DOE personnel maintain sole responsibility for managing a project's available resources.

What the Core Team approach does very well is to improve communication between all parties so that the agencies can more effectively oversee and direct remedial progress as appropriate.

By working together in a cooperative manner and ensuring all decisions are clearly communicated to the project team and stakeholders, the Core Team achieves a number of benefits including improved project focus, streamlined documentation, a minimized comment/review/revision process and minimized rework or wasted effort.



When less is more

BY LETICIOUS B. WELCHER

Evolution of remediation technology reduces risk at SRS

Technical Point of View

The Savannah River Site began its waste site management program in the 1980s,

with an initial inventory of the site's 515 waste units. This was in concert with the federal regulations requiring environmental restoration and just ahead of the U.S. Department of Energy's development of the Environmental Management (EM) program, whose mission was "to reduce health and safety risks from radioactive waste and contamination resulting from the production, development, and testing of nuclear weapons."

Preliminary environmental cleanup efforts revolved solely around risk management and visible, obvious remediation. Aggressive approaches like ground water pump and treat with air stripping and waste site capping with clay were the primary modes of remediation with the goal being to eliminate the source of contamination at all costs.

"We went after the largest seepage basins and landfills, with one goal in mind: get them out of service and safely capped," says Dr. Dean Hoffman, Manager, Soil and Groundwater Closure Project Development.

Capping seepage basins with kaolin clay caps and pumping

and treating contaminated groundwater seemed like the way to go. It was soon found that though effective at waste management and source control, these somewhat aggressive technologies alone eventually were more costly than beneficial to the overall goal of risk management. Source elimination technologies such as groundwater air stripping and waste unit capping and excavation were needed at times and indeed effective at reducing contaminants. However, the exclusive use of these technologies resulted in expending large sums of capital.

Balancing Cost and Technologies

Eventually, SRS balanced the cost of cleanup with the risk and realized that to achieve overall risk reduction the focus needed to be centered on not one unit and one technology, but instead over a larger area of impact with passive technologies included. The goal of the SRS environmental restoration program underwent a shift from waste unit assessment and source control approaches to cost efficient ways of reducing overall risk to human health and the environment in whole areas of the site.

Under the SRS Environmental Restoration program, now Soil & Groundwater Closure Projects, three initiatives were identified



At SRS, the commitment to protecting the health of its environment and stewardship of that environment are critical missions.

that accelerated risk reduction and cleanup. One involved the accelerated closure of the Old Radioactive Waste Burial Ground, the Site's highest risk waste unit. Another accelerated contaminant reduction in Fourmile Branch, a watershed that feeds into the Savannah River. The third initiative continually accelerates risk reduction through innovative technologies and improved processes.

Determining the most environmentally sound method of cleaning up each waste unit has always been a major component of SRS environmental restoration efforts. Two major federal statutes now govern these activities.

The Resource Conservation and Recovery Act (RCRA) establishes a system for tracking hazardous wastes from "cradle to grave." This act also requires corrective action for releases of hazardous waste at inactive waste units. In addition to RCRA the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA – also known as Superfund) addresses the cleanup of hazardous substances. This act establishes a National Priorities List of sites targeted for assessment and restoration, and if necessary, removal action. SRS was placed on this list in December of 1989.

Working with Regulators

In addition, the DOE has entered into agreement with the U.S. Environmental Protection Agency Region IV and the S.C. Department of Health and Environmental Control through a regulatory document called the Federal Facility Agreement (FFA). The FFA specifies how SRS will address contamination or potential contamination at waste units to meet RCRA and CERCLA requirements. SGCP currently enjoys a strong working relationship with the three parties. The relationship allows new and innovative proposals as early as possible to streamline the remediation process.

The implementation of a Core Team, comprised of state and federal agencies, DOE and SGCP personnel, has also greatly improved communication and productivity. The team allows all parties involved to negotiate waste unit resolution at an earlier stage than any previous process. In 2003 the parties signed a Memorandum of Agreement to achieve accelerated cleanup at SRS and are working together to develop a Comprehensive Cleanup Plan which includes both inactive waste sites and facilities.

SRS has continued to work closely with both state and federal regulators to determine which waste units require cleanup through careful characterization and what method of cleanup would be the most efficient.

Examining the impact that remediation has had on the environment and the cost effectiveness of different techniques gives way to more innovative approaches. As a result, many of the techniques used in the past to dispose of wastes generated by the

Site's nuclear operations have been replaced, or in many cases enhanced by newer more passive waste disposal technologies. These technologies are designed to provide greater protection for human health and the environment – thus creating a shift in the approach to environmental restoration from risk management to risk reduction.

While the majority of the groundwater beneath the Site is relatively contamination free, some has been contaminated by industrial solvents, tritium, metals, or other substances that were used or generated by past SRS operations.

Since there are both active and passive soil and groundwater systems currently in operation on the site, enhancements are continually pursued. Examples of these enhancements are injections of base solution into groundwater plumes for increasing the pH to decrease the precipitation of metals into a nearby stream, safely capping waste sites and installing more efficient groundwater treatment systems, deploying phytoremediation to manage tritium in groundwater and using bioremediation in the subsurface to remediate groundwater.

Phytoremediation is a technology that utilizes the ability of naturally occurring plants to degrade volatile organic contaminants released to the subsurface while at the same time minimizing risks to public health and the environment. Trees and plants undergo a natural process called transpiration that degrades, contains or releases these contaminants to the atmosphere in trace amounts. Dose studies indicate that releases to the atmosphere are in trace amounts and well below regulatory standards.

Bioremediation, on the other hand, is a natural process which allows normal soil bacteria to degrade chlorinated solvents *in situ* if they are stimulated with oxygen and additional nutrients.

Monitored Natural Attenuation (MNA) also began to emerge as a key approach to enhance the technologies already in place. As a part of the MNA program, long-term monitoring was implemented at a number of the less contaminated waste sites.

Ongoing Monitoring

All of these technologies combined still cannot provide complete remediation. In order for there to be true closure, the ultimate goal of any environmental restoration program, there should be ongoing monitoring programs in place to observe the natural degradation that will continue to take place over time.

At SRS, the commitment to protecting the health of its environment and stewardship of that environment are critical missions. The shift to passive approaches coupled with less intrusive remediation technologies are leading the forefront to attaining this goal. Using approaches that reduce risk to future populations and ensure adequate protection of human health and the environment remains the Savannah River Site's top priority.

Streamlining and Efficiency

Stormwater drain for Tritium Phytoremediation Project saves \$4.6 million

By LISA SAVAGE-LEONARD



Installing a stormwater drain at the Mixed Waste Management Facility's (MWMF) Tritium Phytoremediation Project was a success for the General Separations Area Project Team. The drain eliminated the need for an additional 38-acre expansion which would have cost approximately \$1 million for construction and \$300,000 a year for operation and maintenance – a total of \$4.6 million for a 12-year cycle.

Substantial reductions

The drain significantly reduces the volume of clean rainwater draining to the phytoremediation collection pond from an upgradient sediment basin, the Solid Waste parking lot and the Old Radioactive Waste Burial Ground. The phytoremediation pond collects tritiated seep water for irrigation of an adjacent forest. As a result of irrigation, the tritium is evaporated or transpired by the trees. Collection and disposition of the tritiated seep water reduces the total curies of tritium released to Fourmile Branch from the MWMF.

Without the drain, disposition of the tritiated seep water would have required an additional 38 acres of irrigation to maintain the same curie reduction to Fourmile Branch. Prior to construction, stormwater runoff drained into the phytoremediation collection pond, diluting the tritium concentration in the pond, thereby decreasing the efficiency of the phytoremediation project.

Before the drain

Before the drain system was installed, pond concentration averaged only 8,000 pCi/mL (curies per milliliter of water) of tritium. Installation of the drain system has increased average pond concentration to about 16,000 pCi/mL of tritium. Consequently, the phytoremediation project is more effective at reducing the tritium curies in Fourmile Branch.

Drain construction was completed in June 2002. The drain is a corrugated polyethylene pipe, 36 inches in diameter and 1,875 linear feet long. The pipe collects the stormwater uphill of the phytoremediation pond and drains the stormwater to a dissipation area behind the phytoremediation pond.

Full-scale operation of the project, a Resource Conservation & Recovery Act interim action, began in March 2001. It consists of a sheetpile dam and a 22-acre irrigation system to disposition tritiated groundwater collected at the seepage line.

The goal was to achieve 25 percent reduction of tritium flux to Fourmile Branch by closing the valve on the dam. The project has since irrigated approximately 30 million gallons of tritiated water. More efficient technologies for evaporating/transpiring water are being investigated. The first two years of operation occurred during a severe drought. Additional expansions to the irrigation system are expected to manage water collected in the pond during periods of normal rainfall.

The team will continue to operate the Tritium Phytoremediation project for at least the next 12 years.

D&D activities remove 23 buildings from TNX skyline

By BILL AUSTIN



The TNX facility is shown prior to D&D activity (above) and after removal of several buildings (below).



With the submittal of the required documentation to WSRC Property Management to close out property financial records for demolished facilities in TNX, dismantling and removal (D&R) work of the non-contaminated facilities in TNX is complete. All of the 23 non-contaminated or clean facilities in TNX slated for demolition have disappeared from the SRS skyline.

The entire demolition project included about 112,000 square feet, including the inter-area steam line. The last buildings to go were 682-T, 692-T, 904-T and 772-T. In addition, all of TNX's ancillary equipment, area fencing and power poles have been removed.

Throughout the project, the team experienced many firsts, including the implementation of earned value reporting, coordination of simultaneous D&R activities by site organizations and subcontractors, incorporation of the Behavior-Based Safety Process, successful completion of a multi-facility Assets-for-Services D&R subcontract, implementation of the new Automated Hazard Analysis process, development of the site Basic Ordering Agreement for D&R work activities, and use of Flexible Skills Assignment personnel.

Crediting his project team for its outstanding support during the year, Project Manager Dave Bokesch said, "We began work in TNX in September 2002 and completed the milestone as of Nov. 30, 2003. We have a terrific project team, a great effort. All members remained focused, cost conscious and above all, safe. Throughout the duration of the project, we had no injuries!"

He continued, "For project managers and their teams, the sound of crunching metal is like music to our ears, but then so is the silence of the heavy equipment when we know we have successfully completed our project."

Sincere congratulations are extended to Bokesch and his project team for outstanding performance in completing the D&R of T Area ahead of schedule and within budget.

South end of 313-M falls in early morning fog

By BILL AUSTIN



August 13 marked the beginning of the end for Building 313-M.

At 8 a.m. on Aug. 13, a new backhoe excavator shear took the first demolition crunch out of the main portion of Building 313-M. By 8:15 a.m., the south end of the structure had fallen to the ground in the early morning fog.

"Because of the hard work by Construction, Radcon and the rest of our Site Decommissioning and Deactivation Project Team, cutting of the concrete structure was able to begin this morning," said Tony Long, Project Manager. "We are now four weeks ahead of schedule."

Back in May, Long answered questions regarding 313-M's critical path and said that plans called for the demolition of the Chemical Treatment Facility (CTF) portion of the building in March, with the main 313-M Building demolition work to begin in October.

However, just as Long predicted in his earlier report, CTF demolition resumed in July, with the main building following in August. "It's clear that the success of this project is because of the team's strong effort throughout the duration of the project," Long added. As of October 1, 2003, the entire structure was demolished and waste removal started.

SGCP Operations Puts Safe Work Ethics Into Practice

By CATHY MADORE



Bill Jones, SGCP E&I Technician




Tony Monroe, Multi-Skilled Technician



Chris Ewing, SGCP Scheduler

The SGCP Operations Department adopted the Institute of Nuclear Power Operations' Stop, Think, Act and Review (STAR) self-checking work practice as a core value in late fiscal year 2000.

STAR has led to significant success and in many instances the benefits were so great that "we needed a way to formally recognize our employees in these instances," said Ron Steve, SGCP Operations Manager. "Further, it was very important to reinforce these behaviors since the consequences were so outstanding." The STAR pin award – based on "positive interventions" – is the result.


"It was very important
to reinforce these behaviors
since the consequences were so outstanding."
Ron Steve, SGCP Operations Manager

The Operations Department rigorously screens award nominations. "The STAR pin award needs to be special, not just an everyday occurrence," Steve said.

STAR pins were recently awarded to three Operations employees.

Bill Jones, SGCP E&I Technician, received his pin for diligent troubleshooting efforts pertaining to the Miscellaneous Chemical Basin Bank One Air Compressor high temperature condition. After completing the initial troubleshooting of the unit, preliminary indicators pointed to a failing solenoid causing the unit to operate at a much higher temperature than normal. Instead of performing the requisite parts change out as the condition indicated, Jones sought out additional technical input. This initiative led to additional evaluations, enabling the proper repair to be performed.

Multi-Skilled Technician Tony Monroe was credited for his initiative to replace temporary height adjusters on sample pumps at the H-Area Groundwater Treatment Unit with a more cost-effective, reusable pump stand. Management approved the stand, which is currently deployed in the field for use.

At a recent Plan of the Week meeting, a resin change on column 2006 of the H-Area Groundwater Treatment Unit was confirmed and scheduled. Chris Ewing, SGCP Scheduler, recalled previous difficulties with a resin change because of expired shackles used as part of the rigging equipment. The scheduler visited the work area and found that while the shackles were within their expiration date, the straps had expired. Operations personnel confirmed his assessment and replaced the rigging straps.

In each instance, personal dedication and initiative motivated actions that provided program efficiency improvements and a commitment to effective and timely operations.